Babine Watershed Monitoring Trust

2012 Annual Monitoring Plan

FINAL DRAFT

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Approved: March 21, 2012

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1. Introduction

The Babine Watershed Monitoring Trust (BWMT) is directed through its Trust Agreement Document to be responsible for "*planning, prioritising, directing, facilitating and funding impartial monitoring research of the implementation and effectiveness of public land use plans and related natural resources management activities in the Babine Watershed*"; and "*providing credible monitoring research results as part of a formal rigorous adaptive management process that enables continuous improvement of public land use plans resulting in better management of environmental values in the Babine Watershed.*"

This document constitutes the 2012 Annual Monitoring Plan (AMP) for the Babine Watershed Monitoring Trust, which the Trustees are required to produce under Section 10.2 and Schedule C of the BWMT Agreement. The first Annual Monitoring Plan was approved by the BWMT in July of 2005. Since then, AMPs have been completed annually. Each year, some planned projects have not been completed and have carried over to subsequent years for a variety of reasons. These projects remain a priority of the BWMT, and appear in subsequent AMPs.

The 2012 AMP sets out the year's budget, lists high-priority monitoring projects, describes projects approved for direct funding, and identifies topics requiring additional funding. The plan provides a synopsis and rationale for each approved project. The BWMT allocates funds to monitoring projects using the process for determining priorities and costs prescribed in the BWMT Agreement and described in the Babine Watershed Monitoring Framework (see www.babinetrust.ca).

2. Budget

The funds available from the Babine Watershed Monitoring Trust Revenue Trust Account (BWMT Agreement, Section 3.1.3) are set out in Table 1. The BWMT will receive a private donation by March 2012 with a total value of $35,000; additional donations make up over $15,000. These funds are available to directly support the 2012 AMP. There is no longer matching funding available from the provincial government. There are also funds carried over from 2011—unallocated or project surpluses.

Table 1. Budget for 2012.

	Contributed	Available under the 2:1 private/public ratio rule	Funds Available to be Distributed	Banked for 2013
Revenue Trust Account				
Private donations expected 2012	$35,000.00	$35,000.00		
Donations 2011	$15,484.78	$15,484.78		
Levered funds: 2011	$0.00	$0.00		
BC gov't – remaining funds	$0.00	$0.00		
Revenue Trust Account Funds Available		**$50,484.78**	**$50,484.78**	
Other Funds				
Banked Funds from 2011			$16,606.37	
Interest Income 2011			$619.67	
Other Funds Available			**$17,226.04**	
Total Funds Available			**$67,710.82**	
Expenses				
Administrative &Technical Support			($14,495.90)	
New Projects 2012 (3 projects)			($39,038.70)	
Total Expenses			***($53,534.60)***	
Funds Available minus Expenses			***$14,176.22***	***$14,176.22***

3. Monitoring Priorities

The Trust supports monitoring projects, maintains the Babine Watershed Monitoring Framework and administers the monitoring program.

The Monitoring Priority Tables generated by the Monitoring Framework show priorities and associated costs for the following types of monitoring:

1. collecting indicator data (implementation monitoring),
2. monitoring to improve knowledge and reduce uncertainty (validation monitoring/research),
3. monitoring to detect negative consequences (effectiveness monitoring).

Appendix 1 summarises funding decisions for high-priority monitoring topics in each of the three types. The order within each list indicates relative priority assigned by the Monitoring Framework as updated in 2010. The tables also provide a brief rationale for each funding decision. Not all topics can be funded. Higher-priority topics will usually be funded preferentially. When a lower-priority topic is selected for funding, a rationale is provided as to why the higher-priority topics were not chosen. All non-funded topics lower on ranked lists are not funded because of insufficient funds.

The Priority Tables also note objectives that cannot be monitored because targets are lacking (Appendix 3). Government has been advised that it needs to amend land-use plans to include measurable targets so the BWMT can monitor these objectives, but progress is slow.

4. Approved Monitoring Projects for 2012

4.1 Ongoing Projects from Previous Years

Six projects will be essentially completed by March 31, 2011, awaiting final report and presentation and invoicing (Table 2). Two further projects will continue into 2012 (Table 2).

Table 2. Ongoing projects from previous years (values to nearest $).

Project Number	Title	Status	Funding Committed
2006-3	Wilderness Value of Babine River Corridor	Phase I ($5,276) will be completed by March 31, 2013	$15,827
2009-1	Rare Ecosystems (Phase I and II)	Will be completed by March 31, 2012.	$10,551
2009-2	Human/Grizzly Bear Interactions and Education: Baseline Data	Will be completed by March 31, 2012.	$10,551
2009-A3	Fundraising	Ongoing	$3,429
2010-1	Timing of Industrial Activities	Will be completed by March 31, 2012	$4,220
2010-A3	Data Management	Will be completed by March 31, 2012	$6,331
2011-1	Non-timber Forest Resources	Will be completed by March 31, 2012	$4,220
2011-2	Ecosystem Network and Natural Disturbance	Will be completed by March 31, 2012	$23,212
Total			**$78,341**

4.2 New Projects

The allocation of available funds for this year is shown in Table 3. Three new monitoring projects, are approved for full funding by the BWMT in 2012. These projects will prioritise future monitoring for grizzly bears through an expert workshop, summarise and/or analyse newly-available data to update indicators for several objectives and design and conduct a high-priority project investigating water quality. Funds are also approved for ongoing administrative and technical support.

Table 3. Approved projects for 2012. "A" designates administrative and technical support (nearest $).

Activity	Project Number	**Title**	**Funding Committed**	**% of Total**
New projects	2012-1	Grizzly bear workshop	$5,276	10
	2012-2	Indicator data summaries	$12,661	24
	2012-3	Water quality	$21,102	39
Project support	2012-A1	Technical Support	$9,496	18
	2012-A2	Administrative Support	$5,000	9
Total			**$53,535**	

Project costs form 73% of new expenditures for 2012; support costs form the remaining 27%. Total expected expenditures for 2012 are $78,341 for ongoing projects plus $39,039 for new projects. Support costs form 12% of this combined total in 2012.

New and ongoing projects are described in the following synopses. Synopses for completed projects are included in Appendix 2 until the results have been incorporated into the Knowledge Base and included in other processes (e.g. BWMT Plan Amendment Process and Criteria), at which point the project summaries are included in a BWMT 5-year Activity Report. Subsections listing consequences for the Knowledge Base and consequences for management summarise actions precipitated by each project.

5. New Project Synopses 2012

Project 2012-1: Collaborative grizzly bear workshop

Abstract:

This project will provide seed funding for a collaboratively-run workshop for grizzly bear and ecosystem experts. It has three objectives: to assess previous work on Babine grizzly bears, including limitations of data and knowledge gaps; to direct future monitoring activities; and to bring together groups with an interest in Babine grizzly bears. The workshop could evolve into an expansion of methods recommended in Wellwood and Pfalz (2009) to produce a conceptual cumulative effects framework.

Status: Initiated in 2012.

Geographic scope: Population of grizzly bears that use the Babine Watershed.

Objectives listed in land-use plans: Various under goals to maintain grizzly bears in all plans.

Type of monitoring: This project will assist with prioritising future monitoring.

Potential leaders: Deb Wellwood (consulting biologist)

Potential partners: TBA

Funding: $5,000 (before HST)

Consequence for knowledge base: This project will allow for an assessment of grizzly bear work to date in the Babine and will assist with prioritising future monitoring. Information from the workshop may allow updates of the knowledge base. The workshop will also provide a broader peer review of past work.

Consequence for management: This project will support management decisions, through appropriate processes which are separate from the BWMT, by showing the level of risk and uncertainty associated with strategies to maintain grizzly bears. It may increase confidence in current activities, suggest further monitoring projects or lead to initiation of a plan-amendment process.

Project 2012-2: Indicator data summary

Abstract:

This project will investigate data availability, through existing spatial analyses and updated data layers (e.g. vegetation resources inventory, higher-level plan spatial analyses) to address gaps in implementation data for the following indicators:

- deciduous stands—natural amounts and % of natural
- equivalent clearcut area for the Kispiox portion of the watershed
- timber salvage—% of disturbed stands salvaged
- timber growth—% of stands in old seral stage
- tree species—natural amounts and % of natural for each species
- stand structure—% retention, % of various structures.

The project will summarise analyses as they apply to the Babine, will complete new analyses if necessary, and will note cases for future work, where data remain unavailable.

Status: Initiated in 2012.

Geographic scope: Babine Watershed unless specified (i.e. ECA for Kispiox portion).

Objectives listed in land-use plans: Various, including deciduous stands, tree species and stand structure under the goal to maintain biodiversity, water quality, and timber salvage and growth.

Type of monitoring: Collecting indicator data (implementation monitoring).

Potential leaders: To be determined through Expression of Interest process.

Potential partners: To be determined.

Funding: $12,000 (before HST)

Consequence for knowledge base: This project will collect indicator data for several objectives with missing information to facilitate risk analysis for these objectives.

Consequence for management: This project will support management decisions, through appropriate processes which are separate from the BWMT, by showing the level of risk and uncertainty associated with strategies to maintain objectives. It may increase confidence in current activities, suggest further monitoring projects or lead to initiation of a plan-amendment process.

Project 2012-3: Water quality

Abstract:

This project has three phases, with each phase being dependent upon successful completion of previous phases:

- Phase I will gather information. Because land-use plans focus on sedimentation rather than including, for example, stream temperature or point-source contamination, there is uncertainty about whether the indicators included in the plans will maintain water quality. This phase will include determining if the BWMT can monitor indicators not currently listed in land-use plans, investigating existing information, particularly that produced by the Bulkley Aquatic Resources Committee, and a potential presentation of data and priorities by Dave Wilford. This phase will provide a more comprehensive list of indicators of water quality in the Babine.
- Phase II will select a priority sub-basin and design a monitoring study with the best value for monitoring (i.e. high priority and achievable) based on the information gathered in Phase I.
- Phase III will conduct the project designed in Phase II.

Status: Initiated in 2012.

Geographic scope: Priority sub-basin within Babine watershed.

Objectives listed in land-use plans: Land-use plans include a goal to maintain water quality, but focus indicators on those dealing with sedimentation. Thus, there is uncertainty about whether achieving the objectives will achieve the goal.

Type of monitoring: Reducing uncertainty

Potential leaders: To be determined through Phases I and II.

Potential partners: Dave Wilford (hydrologist, MFLNRO)

Funding: $20,000 (before HST)

Consequence for knowledge base: Phase I will determine appropriate water quality indicators. Phases II and III will gather information on a priority indicator.

Consequence for management: This project will support management decisions, through appropriate processes which are separate from the BWMT, by showing the level of risk and uncertainty associated with strategies to maintain water quality. It may increase confidence in current activities, suggest further monitoring projects or lead to initiation of a plan-amendment process.

6. Ongoing Project Synopses

Project 2011-1: Non-timber Forest Resources

Abstract:

This project will assess the current state of indicator data for pine mushroom and huckleberry habitat, and will recommend further work as necessary. The project will either summarise or assess the amount of high-value mature pine mushroom habitat based on a GIS analysis of current databases (forest cover species, seral stage and PEM site series). High-productivity sites occur frequently in mature forest stands (80 – 200 years) with submesic soil moisture and poor-medium soil nutrients (01b sites in the ICHmc1 and mc2).

The project will also collate available information on the condition of huckleberry habitat. Strategies to provide sunlight on harvested sites and to limit site disturbance are intended to enhance berry productivity. Site series, aspect, elevation, and burning also influence berry production. This project will collate existing information available to assess these factors and recommend a process for examining the effectiveness of strategies over time.

Pine mushrooms and huckleberries are both important cultural resources. If further work is appropriate, this project will design a process to involve people with an interest in the resources.

Status: Initiated in 2011. Anticipated completion March 31, 2012.

Geographic scope: Kispiox portion of Babine watershed.

Objectives listed in land-use plans: The Kispiox SRMP includes an objective to maintain high-value pine mushroom sites and to maintain or enhance the productivity of berry habitat within berry management areas.

Type of monitoring: Collecting implementation monitoring data

Contractor: Larry McCulloch

Potential partners: Gitxsan Houses, Glen Buhr MoFR

Funding: $4,000 (before HST)

Consequence for knowledge base: This project will collect indicator data on pine mushroom and huckleberry habitat to facilitate risk analysis. It will outline a process to involve interested people in effectiveness monitoring.

Consequence for management: This project will support management decisions, through appropriate processes which are separate from the BWMT, by showing the level of risk and uncertainty associated with strategies to maintain pine mushroom and berry habitat. It may increase confidence in current activities, suggest further monitoring projects or lead to initiation of a plan-amendment process.

Project 2011-2: Ecosystem Network and Natural Disturbance

Abstract:

This project will collect data to reduce uncertainty about the effectiveness of the designed ecosystem network (including core areas and landscape corridors) to maintain biodiversity given the recent climatically-induced mountain pine beetle disturbance. There are three potential phases, the first two of which are included in this year's budget.

Phase I is a GIS exercise determining the extent of pine, and the extent (and predicted extent) of disturbance due to pine beetles, in the ecosystem network of the Babine Watershed.

Phase II includes field sampling of structure, mortality and vegetation to calibrate the level of disturbance determined in the GIS work. This field sampling will also provide a baseline for future effectiveness monitoring. Phase II will be initiated only if there is significant area of pine and potential for significant levels of disturbance in the ecosystem network.

Phase III involves field sampling of appropriate organisms to determine the effectiveness of core areas and landscape corridors. This year's project will recommend organisms for study, but will not include sampling.

Because pine beetle disturbance in ecosystem networks is a current topic of interest for several organisations, it will be important to build relationships that encourage maximum synergies as part of this project rather than working independently.

Status: Initiated in 2011. Anticipated completion March 31, 2012.

Geographic scope: Babine Watershed.

Objectives listed in land-use plans: Land-use plans include objectives to maintain core ecosystems and to maintain the function of landscape corridors. Ecosystem networks (core areas and landscape riparian corridors) are essentially a strategy for achieving other objectives. Objectives for landscape corridors include maintaining the connectivity of mature and old forest (Kispiox SRMP Table 2) and retaining most of the structure and function associated with old forest (Bulkley Landscape Unit Plans).

Type of monitoring: Reducing uncertainty and collecting baseline data

Contractor: Larry McCulloch

Potential partners: Glen Buhr, MoFR; Dave Ripmeester, PIR (Collaborative HLP Objective Spatial Analysis Project)

Funding: Phase I: $2,000 (before HST); Phase II (if appropriate based on Phase I): $20,000 (before HST)

Consequence for knowledge base: This project will collect data on the level of impact of mountain pine beetle disturbance to reduce uncertainty about the effectiveness of ecosystem networks at maintaining biodiversity.

Consequence for management: This project will enable better management decisions to be made, through appropriate processes which are separate from the BWMT, by reducing the level of uncertainty associated with the status of the ecosystem network. It may increase confidence in current activities, suggest further monitoring projects or lead to initiation of a plan-amendment process.

Project 2010-1: Industrial Activity Timing

Abstract:

This project will collect information on the timing of industrial activities in relation to mountain goats, grizzly bears and recreation. Industrial activities investigated will include all stages of forest management, including road building, harvesting and silviculture, as well and mining and exploration.

For mountain goats, the project will determine the proportion of industrial activities within 200 m and 500 m of goat habitat during the natal period (April 15 – July 15). It will also determine activities in this zone during winter (October to March), because Project 2008-3 noted that winter activity should also be an indicator. For minimising disruption to grizzly bears, hibernation is the timing variable of interest. Because bears are active throughout October, the project will determine the proportion of industrial activity in mapped grizzly bear zones from November to March. For wilderness value, the project will determine the proportion of industrial activity within the Babine River Special Management Zone from November to March (winter) and from August to October (peak tourism period).

This project will query existing databases (e.g. RESULTS), and interview knowledgeable people as necessary.

Status: Initiated in 2010. Anticipated completion March 31, 2012.

Geographic scope: Babine watershed.

Objectives listed in land-use plans: The Bulkley LUPs have a strategy to avoid harvesting near mountain goat habitat during the natal period. The Kispiox SRMP and Babine LUP have strategies to harvest during winter in various zones to minimise disruption to grizzly bears and to maintain wilderness value in Babine River Corridor Park. Bulkley LUPs have strategies to harvest in winter to protect connectivity in landscape riparian corridors.

Type of monitoring: Collecting implementation data.

Contractors: Deborah Cichowski and Johanna Pfalz

Potential partners: PIR may be able to provide in-kind assistance.

Funding: $4,000 (before HST)

Consequence for knowledge base: This project will collect implementation data to allow for risk assessment.

Consequence for management: This project will enable better management decisions to be made, through appropriate processes which are separate from the BWMT, by showing the level of risk and uncertainty associated with current timing of industrial activities. It may increase confidence in current activities, suggest further monitoring projects or lead to initiation of a plan-amendment process.

Project 2010-A3: Data Management

Abstract:

This project will develop and implement a process to gather, maintain and access spatial information. Funding covers hardware and fees for a Data Administrator to complete the following tasks:

- provide the necessary hardware,
- develop an appropriate data management model,
- document standards for GIS data for use with BWMT projects,
- locate and load existing BWMT data from previous years, and
- load data from projects completed this year.

The project is based on the description of Phase I presented to the BWMT, as requested, by Johanna Pfalz in October, 2009.

Status: Initiated in 2010; contract let 2011. Anticipated completion March 31, 2012.

Geographic scope: Babine watershed.

Objectives listed in land-use plans: Not applicable

Type of monitoring: All

Contractor: Johanna Pfalz

Potential partners: Consideration of partners will occur in future Phases.

Funding: $2,690 for set-up and loading existing data. A maximum of $3,310 further will be available for ongoing administration over the year (it is anticipated that this cost will be lower than projected). Total budget: $6,000 (before HST).

Consequence for knowledge base: This project will track spatial data for BWMT projects, increasing efficiency for future projects and facilitating updates.

Consequence for management: Not applicable.

Project 2009-1: Rare Ecosystems Phase I and II

Abstract:

This project will collect implementation data to allow an assessment of the risk and uncertainty associated with rare ecosystems. It will examine the percent of rare ecosystems that are in an appropriate seral stage to include the plant communities for which they are designated. Two independent sources of data are available. First, Sybille Haeussler identified rare ecosystems polygons in the Bulkley and Kispiox several years ago (some of this information was included in the Bulkley State of the Forest report). Second, predictive ecosystem mapping (PEM) will be available in 2010. Comparing the two approaches will be useful for determining monitoring methodology: PEM will likely be able to define rare ecosystems only for large polygons plus very wet or very dry ecosystems; Sybille's analysis is more intensive, but may not cover the entire Babine.

Phase I will investigate available information in hard and digital formats and assess the need for further work, including a comparison of the two methods. Phase II will complete analyses and compare the two approaches as recommended.

Status: Phase I initiated in 2009. Phase II initiated in 2010 and combined for efficiency. Anticipated completion March 31, 2012.

Geographic scope: Babine watershed.

Objectives listed in land-use plans: The Kispiox SRMP and Bulkley LUPs include objectives for maintaining rare ecosystems.

Type of monitoring: Collecting implementation data

Contractors: Patrick Williston and Paula Bartemucci

Potential partners: Allen Banner, Sybille Haeussler, MoFR

Funding: $3,000 in 2009; $7,000 in 2010; Total: $10,000 (before HST).

Consequence for knowledge base: This project will collect indicator data on rare ecosystems to facilitate risk analysis and will reduce uncertainty about the best data for future monitoring.

Consequence for management: This project will enable better management decisions to be made, through appropriate processes which are separate from the BWMT, by showing the level of risk and uncertainty associated with current protection and seral stage distribution of rare ecosystems. It may increase confidence in current activities, suggest further monitoring projects or lead to initiation of a plan-amendment process.

Project 2009-2: Human/grizzly Bear Interactions and Education: Baseline Data

Abstract:

This project has two portions: the first will summarise information on grizzly bear mortality, and the second will summarise the status of current bear awareness education in Babine Watershed.

The grizzly bear mortality portion of the project will gather and re-analyse existing information to provide a more detailed spatial analysis of grizzly bear mortality (harvest and non-harvest related), reported bear incidents and associated management actions (e.g. bears destroyed, relocated) for the Babine Watershed (1990 – present). The project will be based on a review and analysis of MoE "compulsory inspections" and "problem wildlife occurrence" databases, as well as reports by Dave Hatler (1994-1998) and Deb Wellwood (2001-2003). This information will be used to evaluate mortality-related risk and uncertainty to the portion of the Babine Grizzly Bear Population Unit that uses the BWMT area. The study area will be expanded to cover estimated home ranges of adult female grizzly bears that use the BWMT area. Information summarised will include grizzly bear harvest mortality, non-hunting mortality, frequency and intensity of conflicts, and anthropogenic food source incidents, all examined in the context of detectable spatial features and characteristics potentially influencing risk of mortality (e.g. proximity to features such as trails, roads and settlements; associated anthropogenic food sources). Methods developed and used in the Foothills Grizzly Bear Study area in Alberta and the Greater Yellowstone Ecosystem in the US should be applied as appropriate. Limitations of data, gaps in information and other associated uncertainties will be discussed, including the lack of precise mortality location, uncertainties about home range extent, and the proportion of unreported and undetected mortalities. The project will also review and summarise additional data relevant to bear mortality collected by BC Parks and DFO (e.g. minimum number of different bears observed per salmon season, bear incidents, estimates of people).

The education portion of the project will review and summarise the bear awareness education currently available to people using the Babine Watershed, including those delivered on-site, to evaluate the potential effectiveness of the education for reducing undesirable interactions between people and bears. It will a) review government bear awareness and safety education information (e.g. BC Parks website, MoE brochures, hunting guides) and any worker bear awareness and safety courses that may be provided for people working in the area; b) assess whether the information meets current knowledge and advice (e.g. Staying Safe in Bear Country Society); and c) summarise current education efforts in the BWMT area (e.g. signs, one-on-one Ranger contact at bridge and weir area). Studies from other areas can provide a useful comparison of activities (e.g. Davis 2010; summary of bear viewing areas). The focus will be on the reliability, quality and availability of information being delivered in the BWMT area for increasing knowledge about grizzly bears and prevention of undesirable interactions with bears. This information will be discussed in the context of recent insights regarding uncertainties associated with translating acquired knowledge into application.

As well as collecting indicator data that will be useful in the short term, the study will provide a baseline for future studies examining the effectiveness of management activities.

Status: Approved in principle in 2009. Modified in 2011. Anticipated completion March 31, 2012.

Geographic scope: BWMT area plus area beyond to include home range of adult female grizzly bears using the BWMT area.

Objectives listed in land-use plans: The entire plan area has objectives to minimise bear/human conflict. The Kispiox SRMP has a strategy for increased public bear awareness, and the Babine River Corridor MDS has a strategy to develop bear awareness and safety information and guidelines.

Type of monitoring: Collecting baseline data for effectiveness monitoring

Contractor: To be determined through request for proposal process.

Potential partners: BC Parks will provide time and in-kind assistance (Scott MacMillan and Brandin Schulz). As available, Deb Wellwood can help with project design.

Funding: $10,000 (before HST)

Consequence for knowledge base: This project will collect baseline data to examine the potential effectiveness of education on reducing human/grizzly bear interactions.

Consequence for management: This project will enable better management decisions to be made, through appropriate processes which are separate from the BWMT, by suggesting data-collection details required for better analyses of the effectiveness of management activities. It may increase confidence in current activities, suggest further monitoring projects or lead to initiation of a plan-amendment process.

Project 2005-4 / 2006-3: Wilderness Value of Babine River Corridor

Abstract:

This project has three phases, two of which will be supported by funds released in 2011.

Phase 1 will explore methodologies, including new approaches based on social networking, that can be used to assess public perception of wilderness value and socially acceptable levels of sustainable use in a non-biased manner.

Phase II will develop a specific approach for the Babine River Corridor, targeted at the complete suite of interest groups. The approach must be able to consider sustainable use in the Natural Environment and Wilderness Recreation Zones of Babine River Corridor Park, and must also investigate perceptions of auditory disturbance throughout the Park. Initiation of Phase II is dependent upon approval of Phase I by BWMT Trustees.

Phase III, for future potential funding dependent upon successful completion of Phase II, will implement the approach.

Status: Initial methodology designed in 2005/2006, but did not meet the requirements of the BWMT. Funding was deferred to allow completion and implementation of the Babine River Corridor Management Plan by BC Parks, of the Quality Waters Strategy and Angling Management Plan and a subsequent risk analysis of new strategies. Park Management Plan will now not be completed in the foreseeable future; hence funds released for Phase I in 2011.

Geographic scope: Babine River Corridor Park

Objectives listed in land-use plans: The Babine River Corridor Park Management Direction Statement includes an objective to maintain a wilderness experience in the corridor, including a sustainable level of recreation. The Kispiox SRMP includes an objective to maintain the aesthetic quality (visual and auditory) of the Babine River Corridor.

Type of monitoring: Detecting negative consequences (sustainable use); reducing uncertainty (auditory disturbance).

Contractor: Megan D'Arcy and Ruth Lloyd (2012). John Shultis, University of Northern BC (2005).

Partners: 2005 phase: Real Estate Foundation Partnering Fund (provided matching funds; 2005), ILMB (provided logistic support).

Potential partners: BC Parks (Brandin Schultz) current phase.

Funding: $5,000 in 2005 (completed); $15,000 (before HST) budgeted in 2006, deferred to future years. $5,000 (before HST) of the $15,000 will be released for Phases I and II in 2011.

Consequence for knowledge base: This project constitutes the first step in detecting negative consequences to sustainable use and wilderness value of the Babine River Corridor.

Consequence for management: This project will enable better management decisions to be made, through appropriate processes which are separate from the BWMT, by determining levels of sustainable use in various zones of Babine River Corridor Park. It may increase confidence in current activities, suggest further monitoring projects or provide input to further development of strategies in Babine River Corridor Park, through amendment of the Management Direction Statement or eventual development of a full Park Management Plan.

7. Administration

Project 2012-A1: Technical support

Abstract:

Continuity of technical support is necessary for effective and efficient management of the monitoring framework, and the BWMT in general. Karen Price will provide technical support to the BV Research Centre and the BWMT as needed. Tasks include

- advise BWMT as necessary on Monitoring Framework
- prepare agenda, facilitate meetings and provide minutes
- communicate with BV Research Centre
- present monitoring priorities (as resulting from Monitoring Framework) to BWMT
    - provide initial description of projects and cost estimates
    - facilitate discussion in relation to project selection
- write draft AMP and revise based on BWMT comments
- liaise with contractors to ensure that projects meet needs of framework and BWMT
    - meet to confirm project design
    - discuss project as necessary
    - review and edit report
    - supervise summary of study to ensure that it allows Knowledge Base to be updated, and describes consequences for the Knowledge Base, for management and for future monitoring
- communicate project status to BWMT as necessary

Status: Initiated in 2007; division between administration and technical support revised in 2009 and 2010. Administered by Bulkley Valley Research Centre.

Geographic scope: Not applicable

Objectives listed in land-use plans: Not applicable

Type of monitoring: Not applicable

Contractor: Karen Price

Potential partners: Bulkley Valley Research Centre

Funding: $9,000.0 (before HST)

Consequence for knowledge base: Not applicable

Consequence for management: Not applicable

Project 2012-A2: Administrative Support

Abstract:

The Bulkley Valley Research Centre provides administrative support in the form of contract management, meeting facilities and support, website maintenance, and communications. Tasks include

- maintain independent financial records
- manage contracts
    - prepare calls for proposals
    - select contractor
    - prepare and implement contract
    - oversee contracts to ensure quality and timeliness of reporting
- add documents to website.

Please see contract schedules for further information.

Status: Ongoing since 2005; division between technical support and administration revised 2009 and 2010.

Geographic scope: Not applicable

Objectives listed in land-use plans: Not applicable

Type of monitoring: Not applicable

Contractor: Bulkley Valley Research Centre

Funding: $5,000.00. Taxes are not charged.

Consequence for knowledge base: Not applicable

Consequence for management: Not applicable

Project 2009-A3: Funding Solicitation

Abstract:

The BWMT needs to broaden its funding base, especially if existing sources of private and government funds decline. The BWMT will develop a communications strategy that includes a fund-raising strategy. Options for partnering will be investigated.

Status: Initiated 2008.

Geographic scope: Not applicable

Objectives listed in land-use plans: Not applicable

Type of monitoring: Not applicable

Contractor: To be determined in consultation with Bulkley Valley Research Centre

Potential partners: Bulkley Valley Research Centre, Government ministries (particularly MFLNRO and MoE)

Funding: $2,000 (2009); $1,250 (2008); total $3,250 (before HST)

Consequence for knowledge base: Not applicable

Consequence for management: Not applicable

8. Appendix 1: Decision Tables

Appendix 1 summarises funding decisions for high-priority topics in three types of monitoring:

- Table A1 (p. 21) **Collect Indicator Data** (Implementation Monitoring)
- Table A2 (p. 23) **Improve Knowledge and Reduce Uncertainty** (Validation Monitoring/Research)
- Table A3 (p. 24) **Detect Negative Consequences** (Effectiveness Monitoring).

Table A 1 Collect Indicator Data (Implementation Monitoring).

Funding decisions for high priority topics for collecting indicator data. Topics for this 5-year period are ordered by relative priority as determined by Monitoring Framework[4]. Shaded projects are completed, ongoing or planned for 2012.

Objective	Indicator	History	Project #	Project name	Funding	Project length	2012 Status	Rationale
Fish habitat	% of natural riparian habitat	Funded 2005	2005-1	Riparian ecosystems	$15,000	1 year	Complete for Nichyeskwa.	Low priority in other watersheds
Riparian biodiversity	% of natural riparian habitat	Funded 2005	2005-1	Riparian ecosystems	as above	1 year	Complete for Nichyeskwa.	As above
Rare ecosystems	% of natural	Funded 2009, 2010	2009-1	Rare ecosystems: phase I and II	$10,551	2 years	Initiated 2009	
Steelhead	Repeated capture	Not funded	—	—	—	—	—	Too expensive to do well
Human/bear interaction	Screening	Not funded	—	—	—	—	—	Will be assessed during grizzly workshop (2012-1).
Human/bear interaction	Education	Funded 2009	2009-2	Human/grizzly bear interaction and education: baseline data	$10,551	1 year for baseline	Initiated 2011	
Water quality	Stream crossing: Kispiox	Assessment funded 2012	2012-3	Water quality	$21,102 (part)	—	Will be assessed	Will be assessed in water quality project (2012-3)
Water quality	Landslides	Assessment funded 2012	2008-1 (part); 2012-3	Water quality	$250 in 2008; $21,102(part) in 2012	—	Will be assessed	Will be assessed in water quality project (2012-3)
Deciduous stands	% of natural	Funded 2012	2012-2	Indicator data summary	$12,612 (part)	1 year	Initiated 2012	

[4] Ordered by secondary score (all topics have high priority for data collection; see Monitoring Framework for methods www.babinetrust.ca).

Objective	Indicator	History	Project #	Project name	Funding	Project length	2012 Status	Rationale
Water quantity	ECA Kispiox	Funded 2012	2012-2	Indicator data summary	$12,612 (part)	1 year	Initiated 2012	
Connectivity	Winter logging	Funded 2010	2010-1	Industrial Activity Timing	$4,220	1 year	Initiated 2010	
Mountain goats	harvest during natal period	Funded 2010	2010-1	Industrial Activity Timing	as above	1 year	Initiated 2010	
Timber salvage	% salvaged	Funded 2012	2012-2	Indicator data summary	$12,612 (part)	1 year	Initiated 2012	
Backcountry recreation	Amount primitive	Funded 2010	2010-2	Recreation Opportunity Spectrum	$5,276	1 year	Completed 2011	
Gunanoot Lake	Visual quality	Not funded	—	—	—	—	—	
Grizzly bears	harvesting in bear units	Funded 2009	2009-3	Grizzly Bear Habitat	$10,250	1 year	Completed 2010	
Pine mushroom habitat	% mature sites	Funded 2011	2011-1	Non-timber Forest Products	$4220.40	1 year scoping	Initiated 2011	
Huckleberries	% sunlight in cutblocks	Funded 2011	2011-1	Non-timber Forest Products	$4220.40	1 year scoping	Initiated 2011	
Huckleberries	% soil disturbance	Funded 2011	2011-1	Non-timber Forest Products	$4220.40	1 year scoping	Initiated 2011	
Timber growth	% old stands	Funded 2012	2012-2	Indicator data summary	$12,612 (part)	1 year	Initiated 2012	
Access to recreation	Inaccessible destinations	Funded 2010	2010-2	Recreation Opportunity Spectrum	as above	1 year	Completed 2011	

Table A 2. Improve Knowledge and Reduce Uncertainty (Validation Monitoring/Research).

Funding decisions for high-priority topics for monitoring to improve knowledge and reduce uncertainty. Topics are ordered by relative priority as determined by Monitoring Framework[6]. Shaded projects are completed, ongoing or planned for 2012.

Objective	Indicator	History	Project #	Project name	Funding	Project length	2012 Status	Rationale
Human/bear interaction	open road density Hanawald and Shedin	Indicator data funded 2007; assessment funded 2012	2012-1	Collaborative grizzly bear workshop	$5,000	1 year	Initiated 2012	Will be assessed in grizzly bear workshop
Tree species	% of natural	Funded 2012	2012-2	Indicator data summary	$12,612 (part)	1 year	Initiated 2012	
Core areas	% alteration	Funded 2011	2011-2	Ecosystem network and natural disturbance	Phase I: $2,110.20; Phase II: $21,102	1 year	Initiated 2011	
Connectivity	% of mature and old in corridors	Funded 2011	2011-2	Ecosystem network and natural disturbance	Phase I: $2,110.20; Phase II: $21,102	1 year	Initiated 2011	
Grizzly habitat	% high-value	Funded 2009	2009-3	Grizzly bear habitat	$10,250	1 year	Completed 2010	
Goat habitat	% unmodified nearby (Gail Ck)	Indicator data funded 2008	—	—	—	—	—	
Goat habitat	Harvest during natal period	Funded 2010	2010-1	Industrial Activity Timing	$4,220.40	1 year	Initiated 2010	
Wilderness value of BRC	Auditory disturbance	Funded 2005; funded 2011; portion deferred	2005-4, 2006-3	Wilderness value of BRC	$5,000 in 2005; $15,000 deferred; $5,275.50 released 2011	2 – 3 years	Re-initiated 2011	
Wilderness value of BRC	Visual quality	Funded 2008; Collaboration with MoFR	2008-5	Visual quality of Babine River	$5,000 BWMT; MoFR $12,000	1 year	Completed 2010	

[6] Ordered by priority to reduce uncertainty and then by secondary score (see Monitoring Framework for methods www.babinetrust.ca).

Table A 3. Detect Negative Consequences (Effectiveness Monitoring).

Funding decisions for high-priority topics for monitoring to detect negative consequences. Topics are ordered by relative priority as determined by Monitoring Framework[7]. Shaded projects are completed, ongoing or planned for 2012.

Objective	Indicator	History	Project #	Project name	Funding	Project length	2012 Status	Rationale
Sustainable use	Encounters in Natural Environment Zone	Funded 2005, 2007; deferred to 2011	2005-4 2006-3	Wilderness value of BRC	$5,000 in 2005; $15,000 deferred; $5,275.50 released 2011	2 years	Re-initiated 2011	
Stand structure	% retention; % various structures (Nichyeskwa)	Indicator data funded 2007	—	—	—	—	—	Wait for completion of project 2011-2
Tree species	% of natural	Not funded	—	—	—	—	—	Wait for completion of project 2012-2
Human/bear interaction	road density Hanawald, Shedin	Assessment funded in 2012	2012-1	Collaborative grizzly bear workshop	$5,275.50	1 year	Assessment in 2012	Will be assessed in project 2012-1
Timber salvage	% controlled	Not funded	—	—	—	—	—	Wait for completion of project 2012-2
Goat habitat	% unmodified nearby (Gail)	Indicator data funded 2008	—	—	—	—	—	
Goat habitat	Harvest during natal period	Funded 2010	2010-1	Industrial Activity Timing	$4,100	1 year	Initiated 2010	
Timber salvage	% susceptible	Investigation funded 2008	2008-1 (part)	Update Knowledge Base	$1,105	1 year	Needs further work	Wait for completion of project 2012-2
Connectivity	% mature and old in corridors	Not funded	—	—	—	—	—	Wait for completion of project 2011-2
Wilderness value of BRC	Auditory disturbance	Funded 2005, 2007; deferred to 2011	2005-4 2006-3	Wilderness value of BRC	$5,000 in 2005; $15,000 deferred; $5,275.50 released 2011	2 years	Re-initiated 2011	
Sustainable use	Floatcraft encounters	Funded 2005, 2007; deferred to 2011	2005-4 2006-3	Wilderness value of BRC	$5,000 in 2005; $15,000 deferred; $5,275.50 released 2011	2 years	Re-initiated 2011	

[7] Ordered by priority to detect consequences and then by secondary score (see Monitoring Framework for methods www.babinetrust.ca).

Wilderness value of BRC	Visual quality	Funded 2008; Collaboration with MoFR	2008-5	Visual quality of Babine River	$5,000 BWMT; MoFR $12,000	1 year	Completed 2010

Appendix 2: Completed monitoring projects

Synopses of completed monitoring projects are included in the Annual Monitoring Plan until the results are incorporated into the Knowledge Base and included in other processes as appropriate (e.g. BWMT Plan Amendment Process and Criteria). Subsections listing consequences for the Knowledge Base, consequences for management and recommendations for monitoring summarise actions precipitated by each project.

Projects completed prior to 2010 have been incorporated into the Knowledge Base. Synopses of these projects are listed in the 5-year Activity Report that is available at www.babinetrust.ca.

Project 2010-2: Recreation Opportunity Spectrum

Abstract:

This project collected indicator data on recreation opportunities in the Babine watershed. Recreation Opportunity Spectrum (ROS) mapping is a method of looking at the landscape to determine what types of recreational experiences are being provided over a landbase in terms of remoteness, naturalness and expected social experience. Recreation opportunity categories in the Babine Watershed included *Primitive, Semi-primitive Non-motorized, Semi-primitive Motorized, Roaded Natural* and *Roaded Modified.* A map of the road network in the area, interviews with people familiar with recreation in the area and past ROS mapping were used in the mapping process.

Recreational features in the Babine watershed include alpine areas, lakes and waterways, with some facilities and trails present to service these features. Recreational activities in the watershed include: angling, hiking, hunting, camping, snowmobiling, all terrain vehicle travel, skiing, rafting, kayaking, jet-boating, botanical forest product harvesting, and wildlife viewing. Some of these activities, such as angling, are concentrated mostly on one feature – the Babine River, while others, such as snowmobiling are dispersed over much of the watershed.

Five ROS Classes were mapped in the Babine Watershed. Areas that are essentially non-motorized cover 61% of the watershed, being in the *Primitive* or *Semi-primitive Non-motorised* classes (Table 1). The *Roaded Modified* class covers the second largest area in the watershed, covering all areas where forest harvesting has occurred. *Semi-primitive Motorized* areas are few due to the difficulty of traveling in non-roaded areas with motorized vehicles, and the relatively low levels of motorized use in this remote area.

Table 1. Portion of Babine Watershed in each Recreation Opportunity Spectrum class.

ROS class	Area (ha)	% of total area
Primitive	107,535	26.8
Semi-primitive non-motorized	128,878	32.1
Semi-primitive motorized	38,984	9.7
Roaded natural	6,818	1.7
Roaded modified	119,718	29.8

Lakes in the watershed occurred in most ROS classes, with eleven lakes being in the Primitive class, nine in the Roaded modified class, four in the Semi-primitive non-motorized class and one in the Semi-primitive motorized class. Most of the Babine River is in the Semi-primitive motorized class, due to use by jet-boats.

Most alpine areas are in the Semi-primitive non-motorized class due to the proximity of roads, though significant portions of the alpine in the north are in the Primitive class. Some alpine areas in the Primitive and Semi-primitive non-motorized classes will have some motorized use, especially from snowmobiles, but their remoteness means motorized usage will be light enough to justify these non-motorized classes.

The land management plans covering the Babine Watershed give direction to implement several access control points to protect wilderness values and tourism, and grizzly bears. Some of these access control points have not been implemented or are ineffective in controlling access as intended. The lack of plan implementation or ineffectiveness of measures in the plan should be rectified so that recreational values are not compromised.

Status: Completed March 31, 2011.

Geographic scope: Babine watershed.

Objectives listed in land-use plans: The Kispiox LRMP includes an objective to maintain primitive recreation opportunities. The SRMP and Nilkitkwa LUP specify areas intended to provide backcountry recreation opportunities. The Babine LUP and Kispiox LRM include an objective to maintain access to recreation destinations.

Type of monitoring: Collecting implementation data

Contractors: Adrian deGroot and Johanna Pfalz

Funding: $5,000 (before HST)

Consequence for knowledge base: This project determined that risk to recreation opportunities is currently low with some uncertainty in relation to lack of implementation or success of access control.

Consequence for management: This project found that primitive and semi-primitive recreation opportunities are well represented. Access to features has not been affected by industrial activity. One potential management issue is that the lack of plan implementation or ineffectiveness of measures may compromise recreational values. In particular, access control points at Sperry/Rosenthal 1, Shenismike West 2, Thomlinson Road 6 have not been implemented, the access control points at Nichyeskwa Connector 7 has been breached and Nilkitkwa 481 Road may have been breached.

Project 2009-3: Grizzly Bear Habitat

Abstract:

This project will reduce uncertainty about maintenance of grizzly bear habitat due to the variety of different strategies applied in different management areas. The project will develop a database about grizzly bear habitat that is relevant to resource managers in Babine Watershed, analogous to the database for mountain goats created in 2008/9. The database will include grizzly bear management areas, high-value habitat, critical habitat, other habitat classes, harvested areas, forest cover, strategies implemented within and adjacent to habitat. This database will build on the access database created during project 2007-1 (Human/ Bear Interaction and Open Road Density) this year.

The project will also initiate development of effectiveness indicators looking at grizzly bear use of habitat. The variety of strategies implemented presents an excellent opportunity for an experiment: this project will consider potential designs for such a project (funding is beyond the scope of the BWMT).

Status: Initiated in 2009. Completed March 31, 2010. Awaiting final report and summary.

Geographic scope: Babine watershed.

Objectives listed in land-use plans: All land-use documents include objectives to maintain grizzly bear habitat.

Type of monitoring: Collecting implementation data

Contractors: Johanna Pfalz, Debbie Wellwood.

Partners: Bear biologists through the cumulative effects modelling process led by Debbie Wellwood and funded through other means.

Funding: $10,000 (before taxes)

Consequence for knowledge base: This project collected indicator data on grizzly bear habitat to facilitate risk analysis.

Consequence for management: This project will enable better management decisions to be made, through appropriate processes which are separate from the BWMT, by showing the level of risk and uncertainty associated with current protection of grizzly bear habitat. It may increase confidence in current activities, suggest further monitoring projects or lead to initiation of a plan-amendment process.

Project 2008-5: Visual Quality in Babine River Corridor

Abstract:

This project investigated visual quality in the Babine River Corridor in collaboration with Glen Buhr, Ministry of Forests and Range. The project had three objectives: to compile existing mapping and photo information for established viewpoints along the Babine River Corridor, to update photo panoramas and to compare the effectiveness of quantitative (FREP protocol) and qualitative (stakeholder surveys) methods at determining whether Visual Quality Objectives have been achieved.

Panoramic photographs have been assembled from existing negatives and from new images for all 18 established viewpoints within the Babine Corridor. Because of the incised nature of the Babine River channel, only one viewpoint, Viewpoint 3, on the lower Babine River, has harvesting visible from the river. Viewpoint 3 has a Visual Quality Objective of "Partial Retention". The quantitative protocol measured an alteration of 12.7%, equating to a classification of "Moderate" (7.1 – 18% alteration). Field assessment, however, assigned a classification of "Partial Retention". Because the two methods disagree, the formal protocol defines the Effectiveness Evaluation for this Viewpoint as "Borderline".

Overall, risk to viewscapes in the upper and lower reaches of the Babine River is low due to the limitation of viewscapes to areas within the park. Risk in the middle reaches is greater as the river valley is wider and more open. To date, no harvesting is visible in the middle reaches. The Atna-Shelagyote Special Management Zone will provide protection to viewscapes in the middle reaches of the river on the north bank, but future harvesting may impact viewscapes elsewhere.

The public survey portion of the project was limited in success as only five people filled out forms despite wide advertising. Only one respondent provided comments about any viewscapes within the Babine River Corridor (though several commented about viewscapes along Nilkitkwa and Babine Lake (outside the BWMT area of interest). It is possible to conclude, however, that people do not have pressing concerns about visual quality at the current time.

Status: Initiated in 2008. Collaboration with MoFR. Completed 2011.

Geographic scope: Babine River Corridor.

Objectives listed in land-use plans: Both the Kispiox and Bulkley LRMPs include objectives for visual quality as well as objectives to maintain the visual elements of wilderness value along the Babine River Corridor.

Type of monitoring: Reducing uncertainty and detecting negative consequences.

Contractors: Ralph Kossman, Megan D'Arcy

Partner: Glen Buhr, Ministry of Forests and Range provided $12,000.

Funding: $5,000 (before taxes)

Consequence for knowledge base: This project has determined that there are currently no negative consequences in relation to visual quality as an element of wilderness value in Babine River Corridor. Unfortunately, due to the lack of Viewpoints with visible harvest, it was not able to reduce uncertainty about discrepancies between quantitative measures of visual quality and public perception.

Consequence for management: This project demonstrates that strategies are currently adequate to ensuring visual quality in the Babine River Corridor. There is no need to revisit visual quality objectives until harvesting increases in the middle reaches of the Babine River.

Combined Project 2008-1 and 2008-2: Update Knowledge Base and Monitoring Priority Tables and Framework Manual and Extension

Abstract:

The first part of this project updated the Knowledge Base by including information gathered from all completed BWMT projects to 2010, investigating and incorporating existing information on landslides, and timber salvage, and consulting experts as necessary for new research and missing model variables. It also re-analysed risk and revised project priority tables for use during the 5-year monitoring period from 2010 – 2015.

The companion part of this project aimed to increase the number of people able to use the monitoring framework. It resulted in a short promotional description of the framework for use in fundraising, and a plain-language manual to complement the framework. In addition, a trainee worked on the update to learn about the framework.

The update was intended to include new objectives and strategies from a Park Management Plan that was being developed for the Babine River Corridor. However, the Park Management Plan process stalled, and due to new priorities, it will not be completed in the foreseeable future.

Status: Initiated in 2008 (first update since 2004). Completed by March 31, 2010.

Geographic scope: Babine watershed

Objectives listed in land-use plans: All objectives and strategies.

Type of monitoring: All types of monitoring.

Project team: Karen Price, Dave Daust, Liz Osborn, Megan D'Arcy, Jeff Anderson

Funding: $12,000 (2008-1) + $5,000 (2008-2) for a total of $17,000 (before taxes) budgeted; $2,306.25 returned to operating fund due to lack of new objectives from park plan.

Consequence for knowledge base: This project updated the knowledge base and priority tables. It will facilitate monitoring decisions for 2010-2015 and beyond. A plain-language manual will assist communication with potential funding sources.

Consequence for management: This project fed back information into the Knowledge Base and highlighted information to be passed on to bodies responsible for management decisions through appropriate processes.

Appendix 3: Objectives and Indicators Lacking Targets

This assessment, updated October 5, 2011, is based on the Babine Watershed Monitoring Trust's Knowledge Base and Priority Tables which were updated in early 2010. These tables consider all objectives and strategies listed in the land-use plans that apply to the Babine Watershed.

Objective	***Indicator***	***Notes***	***Land-use Plans***
Maintain biodiversity			
Maintain natural seral-stage distribution of ecosystems	% old forest by BEC variant	The indicator allows for high uncertainty (BHLP says "*maintain biodiversity by maintaining a natural seral-stage distribution*", but Table 1 targets will likely not lead to a "*natural seral-stage distribution*". Targets need to be defined by productivity class within BEC variant to reduce uncertainty in future estimates (see BWMT project 2007-4P).	BHLP Table 1 SRMP Table 2;
Maintain connectivity in landscape corridors	% mature and old forest within corridors	No specific target in the Bulkley ("*most of the structure and function associated with old forest...*" BHLP); though LRMP lists target of 70% existing structure and function. (70% in Kispiox)	BHLP 1.3a LRMP 2.3.1.2 SRMP Table 2
Maintain connectivity in landscape corridors	% winter harvest in corridors	No target in Bulkley (100% in Kispiox)	Not in BHLP (or LUPs or LRMP) SRMP Table 2
Maintain deciduous ecosystems	% of natural deciduous-leading ecosystems	No targets ("*diversity of...deciduous species representing the natural species composition for each ...subzone*" BHLP); LUPs ("*retain a portion of these species...*"); no target in Kispiox	BHLP 1.4a LUP 1.6.4 SRMP 3.1.1.2
Maintain sensitive riparian areas	% alteration to fluvial ecosystems	Bulkley has no target for alteration beyond FRPA. FRPA targets for riparian reserve and management zones do not reflect the extent of fluvial ecosystems. (No alteration in Kispiox).	Not in BHLP SRMP Table 2
Attain natural landscape pattern	% of area in each patch-size class (logged in Kispiox; nearing rotation age in Bulkley)	Current targets are unrelated to objective (see BWMT project 2007-4P). Targets should be expressed as patch size distribution of mature and old forest rather than distribution of harvested or young forest. Total amount of mature or old forest is the best indictor; patch size distribution has limited predictive power (see project 2007-4P).	Not in BHLP LUPs 1.5 Table 5 SRMP Table 2
Maintain stand structure	Wildlife tree patches and attributes	Current targets are not related to natural amounts (see project 2005-5P for natural amounts in the Babine)	BHLP Table 2 SRMP Table 5

		and are below levels that provide benefits to biodiversity. Concept in LRMP (closer to natural is more likely to maintain biodiversity) is lost in LUPs (and BHLP). "*Maintain the range of structural attributes of old forests...*" SRMP Table 2 is not consistent with Table 5.	
Maintain grizzly bears			
Reduce human/bear interaction	Open road density	This is the best indicator of human/bear interaction. No targets beyond Hanawald and Shedin (Kispiox). BWMT project 2007-1 shows that some sub-basins are already approaching high-risk threshold. BHLP does not provide target and provides no direction for roads in high-value habitat: ("*limit road development...within moderate-value grizzly bear habitat*"; "*avoid human-bear conflicts in high-value grizzly bear habitat*")	BHLP 2.5c (for moderate-value habitat); 2.5d SRMP
Reduce human/bear interaction	Initiation of education programmes	No targets (objective only exists in Kispiox)	Not in BHLP SRMP
Reduce human/bear interaction	% of road with screening	No targets in BHLP; in Babine SMZ in BLUP; No target in Kispiox	Not in BHLP BLUP 4.1
Maintain mountain goats			
Maintain goat populations	Road density < 1km of identified habitat	No target for Kispiox (not in BHLP)	Not in BHLP No direction in SRMP—notes that LRMP direction could result in future guidelines (3.1.2.3)
	% harvest during natal period < 200m from habitat	No target for Kispiox (BHLP "*provide security...by limiting disturbance*")	BHLP 2.3b very vague. No direction in SRMP—notes that LRMP direction could result in future guidelines (3.1.2.3)
Maintain fish habitat and populations			
Maintain bull trout	% habitat protected	No target in Bulkley. See BWMT project 2008-4 for assessment of critical and important habitat. SRMP has single target of no permanent bridge near staging areas.	Not in BHLP SRMP Table 8

Maintain steelhead	Repeated capture	No target for park	Park MDS
Water			
Maintain water flow	ECA %	No targets in Bulkley (changing provincial regulations mean that not all watersheds are subject to assessment); (SRMP has triggers for overview)	Not in BHLP SRMP Table 10
Maintain water quality	Landslides resulting from management	No target for Bulkley (SRMP target = 0)	Not in BHLP SRMP Table 9
Maintain water quality	Sediment from road crossings	No targets for Bulkley (SRMP target = low risk at specified crossings)	Not in BHLP SRMP Table 9
Maintain water quality	Planning	No targets for Bulkley (SRMP target = development of listed plans)	Not in BHLP SRMP Table 9
Timber			
Promote rapid timber growth	% old slow-growing stands	No targets	Not in BHLP
Minimise unsalvaged timber mortality	% of insect and disease damage controlled	No targets	Not in BHLP
Minimise unsalvaged timber mortality	% of natural mortality salvaged	No targets	Not in BHLP
Increase yield in enhanced timber development areas	% of ETDA thinned and pruned	No targets	BHLP 4.1a
Increase yield in enhanced timber development areas	% of ETDA commercially thinned	No targets	BHLP 4.1a
Increase yield in enhanced timber development areas	% of ETDA with improved stock	No targets	BHLP 4.1a
Maintain opportunities for tourism and recreation			
Maintain backcountry opportunities	% backcountry in primitive state	No targets ("*maintain...diverse range of...opportunities*" BHLP); Atna-Shelagyote SMZ in SRMP, but no overall targets.	BHLP 5.1a SRMP Table 13
Maintain access to recreational opportunities	# of inaccessible destinations	No target in Kispiox (BHLP: "*maintain reasonable access*")	BHLP 5.2a
Maintain and use botanical forest products			
Maintain or enhance productivity of berry habitat within berry management areas	% soil and vegetation disturbance	No target in Kispiox (objective only pertains to Kispiox)	SRMP Table 18

Appendix 4: Abbreviations

BRC .....Babine River Corridor
BWMT ..... Babine Watershed Monitoring Trust
CFS.....Canadian Forest Service
DFO ..... Department of Fisheries and Oceans
ECA .....Equivalent Clearcut Area
ETD .....Enhanced Timber Development Zones
FREP..... Forest Resources Evaluation Program
FRPAThe British Columbia Forest and Range Practices Act
FSP ..... Forest Sciences Program
GIS .....Geographic Information System
LRMP ..... Land and Resource Management Plan
LUP..... Landscape Unit Plan
MoE .....Ministry of Environment
MFLNRO .... Ministry of Forests, Lands and Nat. Res. Ops.
MDS.....Management Direction Statement
PEM .....Predictive Ecosystem Mapping
SFM Network..... Sustainable Forest Management Network
SRMP..... Sustainable Resource Management Plan
VRI.....Vegetation Resources Inventory